

AMENDMENTS TO THE CLAIMS

Claims 23-68 are currently pending in the application. Claims 23, 43, and 56 are currently amended to clarify the claimed inventions as respectively embodied in these claims, without acquiescence in the cited basis for rejection or prejudice to pursue the original claims in a related application. Claims 69-74 are new. A complete listing of the pending claims is provided below and supersedes all previous listing(s) of claims. No new matter has been added.

1-22 (Canceled)

23. (Currently Amended) A method of handling document operation requests and storing results of document operations requests in a volatile or non-volatile computer readable medium, the method comprising:

receiving a document operation request, the document operation requiring one or more collection elements in a collection within the document to be in a computer-readable memory, wherein the one or more collection elements are designated to be part of the collection with a markup language;

identifying at least one of the one or more required collection elements for processing; determining whether the at least one identified collection element is in the computer-readable memory;

identifying a collection partition associated with the at least one identified collection element, wherein

the collection partition comprises a subset of the collection elements in the document, and wherein

the subset of collection elements comprises at least one collection element in addition to the at least one identified collection element;

loading the collection partition into the computer-readable memory based on a result from the act of determining, wherein

the at least one identified collection element is loaded into the computer-readable memory when the at least one identified collection element is not in the computer-readable memory, and

another collection partition is removed from the computer-readable memory
where there is insufficient space for loading the collection partition; and

executing the document operation with the collection partition.

24. (Previously Presented) The method of claim 23, wherein the collection partition does not exceed a threshold size.

25. (Previously Presented) The method of claim 24, wherein the threshold size is a factor of the memory size.

26. (Previously Presented) The method of claim 24, wherein the threshold size is user defined.

27. (Previously Presented) The method of claim 23, wherein the memory is fixed in size.

28. (Previously Presented) The method of claim 23, wherein the collection partition is a unit in which data is written to or read from a data storage device.
29. (Previously Presented) The method of claim 23, wherein the collection partition comprises collection elements from one collection.
30. (Previously Presented) The method of claim 23, wherein the collection partition is a disjoint subset of a collection in the document.
31. (Previously Presented) The method of claim 23, wherein loading the at least one identified collection element into memory comprises:
loading the at least one identified collection element into a new collection partition in the memory when the at least one identified collection element is not in the memory.
32. (Previously Presented) The method of claim 23, further comprising:
determining whether the memory is full;
selecting one or more collection partitions in the memory for removal when the memory is full;
propagating one or more changes in each of the one or more selected collection partitions to one or more data storage devices storing one or more collection elements in the selected collection partition;
removing the one or more selected collection partitions from the memory; and
updating one or more collection partitions that remain in the memory.

33. (Previously Presented) The method of claim 32, wherein the memory is full when the memory is above a threshold.
34. (Previously Presented) The method of claim 33, wherein the threshold is user defined.
35. (Previously Presented) The method of claim 32, wherein selecting one or more collection partitions in the memory for removal comprises:
selecting one or more least recently used collection partitions in the memory for removal when the memory is full.
36. (Previously Presented) The method of claim 32, wherein updating one or more collection partitions comprises:
updating metadata corresponding to the one or more collection partitions that remain in the memory.
37. (Previously Presented) The method of claim 32, wherein the one or more selected collection partitions do not contain any of the one or more required collection elements.
38. (Previously Presented) The method of claim 23, wherein the document operation is a read, update, delete, insert, or create operation.
39. (Previously Presented) The method of claim 23, wherein the one or more required collection elements are part of one collection.
40. (Previously Presented) The method of claim 23, wherein determining whether the at least one identified collection element is in the memory comprises:

determining whether a collection partition corresponding to the at least one identified collection element has already been loaded into memory.

41. (Previously Presented) The method of claim 40, wherein loading the at least one identified collection element into memory comprises:

loading the corresponding collection partition into memory when the corresponding collection partition has not already been loaded into memory.

42. (Previously Presented) The method of claim 23, wherein the document is an XML document.

43. (Currently Amended) A computer program product that includes a computer readable medium, the computer readable medium being a non-volatile medium or a volatile medium, the computer readable medium comprising a plurality of instructions which, when executed by a processor, causes the processor to execute a process for handling document operation requests, the process comprising:

receiving a document operation request, the document operation requiring one or more collection elements in a collection within the document to be in a computer-readable memory, wherein the collection comprises a set of collection elements designated to be part of the collection with a markup language;

identifying at least one of the one or more required collection elements for processing; determining whether the at least one identified collection element is in the computer-readable memory;

identifying a collection partition associated with the at least one identified collection element, wherein the collection partition comprises a subset of collection elements in the document wherein the subset of collection elements comprises at least one collection element in addition to the at least one identified collection element;

loading the collection partition into the computer-readable memory based on a result from the act of determining, wherein

the at least one identified collection element is loaded into the computer-readable memory when the at least one identified collection element is not within a collection partition in the computer-readable memory, and

another collection partition is removed from the computer-readable memory

where there is insufficient space for loading the collection partition; and

executing the document operation with the collection partition.

44. (Previously Presented) The computer program product of claim 43, wherein the collection partition does not exceed a user-defined threshold size.

45. (Previously Presented) The computer program product of claim 43, wherein the memory is fixed in size.

46. (Previously Presented) The computer program product of claim 43, wherein the collection partition is a unit in which data is written to or read from a data storage device.

47. (Previously Presented) The computer program product of claim 43, wherein the collection partition is a disjoint subset of a collection in the document.

48. (Previously Presented) The computer program product of claim 43, wherein loading the at least one identified collection element into memory comprises:

loading the at least one identified collection element into a new collection partition in the memory when the at least one identified collection element is not in the memory.

49. (Previously Presented) The computer program product of claim 43, wherein the process further comprises:

determining whether the memory is full;

selecting one or more collection partitions in the memory for removal when the memory is full;

propagating one or more changes in each of the one or more selected collection partitions to one or more data storage devices storing one or more collection elements in the selected collection partition;

removing the one or more selected collection partitions from the memory; and

updating one or more collection partitions that remain in the memory.

50. (Previously Presented) The computer program product of claim 49, wherein the memory is full when the memory is above a user-defined threshold.

51. (Previously Presented) The computer program product of claim 49, wherein selecting one or more collection partitions in the memory for removal comprises:

selecting one or more least recently used collection partitions in the memory for removal when the memory is full.

52. (Previously Presented) The computer program product of claim 49, wherein updating one or more collection partitions comprises:

updating metadata corresponding to the one or more collection partitions that remain in the memory.

53. (Previously Presented) The computer program product of claim 43, wherein the document operation is a read, update, delete, insert, or create operation.

54. (Previously Presented) The computer program product of claim 43, wherein determining whether the at least one identified collection element is in the memory comprises:

determining whether a collection partition corresponding to the at least one identified collection element has already been loaded into memory.

55. (Previously Presented) The computer program product of claim 54, wherein loading the at least one identified collection element into memory comprises:

loading the corresponding collection partition into memory when the corresponding collection partition has not already been loaded into memory.

56. (Currently Amended) A system for handling document operation requests, the system comprising:

means for receiving a document operation request, the document operation requiring one or more collection elements in a collection within the document to be in a computer-readable memory, wherein the collection comprises a set of collection elements designated to be part of the collection with a markup language;

means for identifying at least one of the one or more required collection elements for processing;

means for determining whether the at least one identified collection element is in the computer-readable memory, wherein the means for determining comprises a processor;

means for identifying a collection partition associated with the at least one identified collection element, wherein the collection partition comprises a subset of collection elements in the document wherein the subset of collection elements comprises at least one collection element in addition to the at least one identified collection element;

means for loading the collection partition into memory based on a result from the act of determining, wherein

the means for loading loads the at least one identified collection element into the memory when the at least one identified collection element is not in the memory, and

another collection partition is removed from the computer-readable memory
where there is insufficient space for loading the collection partition; and

means for executing the document operation with the collection partition.

57. (Previously Presented) The system of claim 56, wherein the collection partition does not exceed a user-defined threshold size.

58. (Previously Presented) The system of claim 56, wherein the memory is fixed in size.

59. (Previously Presented) The system of claim 56, wherein the collection partition is a unit in which data is written to or read from a data storage device.

60. (Previously Presented) The system of claim 56, wherein the collection partition is a disjoint subset of a collection in the document.

61. (Previously Presented) The system of claim 56, wherein means for loading the at least one identified collection element into memory comprises:

means for loading the at least one identified collection element into a new collection partition in the memory when the at least one identified collection element is not in the memory.

62. (Previously Presented) The system of claim 56, further comprising:

means for determining whether the memory is full;

means for selecting one or more collection partitions in the memory for removal when the memory is full;

means for propagating one or more changes in each of the one or more selected collection partitions to one or more data storage devices storing one or more collection elements in the selected collection partition;

means for removing the one or more selected collection partitions from the memory;

and

means for updating one or more collection partitions that remain in the memory.

63. (Previously Presented) The system of claim 62, wherein the memory is full when the memory is above a user-defined threshold.

64. (Previously Presented) The system of claim 62, wherein means for selecting one or more collection partitions in the memory for removal comprises:

means for selecting one or more least recently used collection partitions in the memory for removal when the memory is full.

65. (Previously Presented) The system of claim 62, wherein means for updating one or more collection partitions comprises:

means for updating metadata corresponding to the one or more collection partitions that remain in the memory.

66. (Previously Presented) The system of claim 56, wherein the document operation is a read, update, delete, insert, or create operation.

67. (Previously Presented) The system of claim 56, wherein means for determining whether the at least one identified collection element is in the memory comprises:

means for determining whether a collection partition corresponding to the at least one identified collection element has already been loaded into memory.

68. (Previously Presented) The system of claim 67, wherein means for loading the at least one identified collection element into memory comprises:

means for loading the corresponding collection partition into memory when the corresponding collection partition has not already been loaded into memory.

69. (New) The method of claim 23, in which the collection partition is defined by a partitioning function.

70. (New) The method of claim 69, in which the partitioning function comprises a hash-based partitioning function or a range-based partitioning function.

71. (New) The computer program product of claim 43, in which the collection partition is defined by a partitioning function.

72. (New) The computer program product of claim 71, in which the partitioning function comprises a hash-based partitioning function or a range-based partitioning function.

73. (New) The system of claim 56, in which the collection partition is defined by a partitioning function.

74. (New) The system of claim 73, in which the partitioning function comprises a hash-based partitioning function or a range-based partitioning function.